



US005091771A

United States Patent [19]

Bolan et al.

[11] **Patent Number:** **5,091,771**[45] **Date of Patent:** **Feb. 25, 1992**[54] **COMPACT PACKAGE FOR ELECTRONIC MODULE**[75] **Inventors:** Michale L. Bolan, Dallas; Robert D. Lee, Denton; James P. Manitt, Garland, all of Tex.[73] **Assignee:** Dallas Semiconductor Corporation, Dallas, Tex.[21] **Appl. No.:** 351,760[22] **Filed:** May 15, 1989[51] **Int. Cl.⁵** H01L 23/02[52] **U.S. Cl.** 357/74; 361/399; 235/488; 235/489; 235/492; 368/87; 368/88; 365/52; 365/228; 365/229; 70/278[58] **Field of Search** 357/74; 361/399; 235/492, 489, 488; 368/87, 88; 365/228, 229, 52; 70/278[56] **References Cited****U.S. PATENT DOCUMENTS**

3,846,971	11/1974	Ho et al.	368/88
3,996,735	12/1976	Zurcher	368/88
4,053,688	10/1977	Perkins et al.	368/88
4,064,689	12/1977	Yasuda et al.	368/88
4,086,752	5/1978	Kishimoto	368/88
4,196,577	4/1980	Ohno et al.	368/88
4,272,838	6/1981	Kasama et al.	368/88
4,426,159	1/1984	Kosaka et al.	368/88
4,982,371	1/1991	Bolan et al.	235/492

FOREIGN PATENT DOCUMENTS

5267674 6/1977 Japan 368/88

Primary Examiner—Rolf Hille*Assistant Examiner*—Steven Lake*Attorney, Agent, or Firm*—Worsham, Forsythe, Sampels & Wooldridge[57] **ABSTRACT**

A very compact package for an electronic data module, which includes battery-backed memory. A two-part metal container is used, which has two shallow concave pieces which fit together. The integrated circuit (in a low-height package, such as a flat-pack or SOIC) is mounted on a very small flexible printed circuit board, which fits inside the container. Laterally spaced from the integrated circuit, on the other end of the small flexible board, the board end is sandwiched between a battery and a piece of elastic conductive material (such as conductive plastic foam). Thus, the battery is connected between one face of the container and a power conductor on the board. The piece of elastic conductive material makes contact between a data trace on the board and the other face of the container. Another trace on the board makes contact directly to the container face on which the battery's ground terminal is connected. Thus, simple wiring on the small board, using through-hole vias, suffices to route power, ground, and data lines to the integrated circuit, while providing a sealed durable package with two external contacts.

19 Claims, 17 Drawing Sheets